ABSTRACT OF THE DISCLOSURE

Quantum switches, referred to as trisistors, operate on the basis of interactions between two elementary particles (EP), such as photons, electrons, phonons, etc. A first EP is used as a control input to the trisistor and interacts with a second EP, thereby inducing a detectable state change in the second EP that determines the trisistor's output value. The physical property which determines the particular EP state could be, for example, polarization, spin direction or energy level. The operation of the various embodiments of the invention is based on a triadic theory of particle behavior that the inventors have proposed in which all interactions between elementary particles can be defined as a function of a history of each particle's quantum states both before and after the interaction between the two particles. The trisistors can be combined to form various types of logic gates, circuits and other computer circuits. To implement the trisistors, one preferred embodiment employs a thin section of nonlinear crystal, such as beta barium borate. Photons, form a laser, for example, are incident as on the crystal as input and interact with electrons therein, thereby changing their states and resulting in the emission of other photons as output.